

like "signature value" of experience that change his tactics.

The Importance of Being Unsure ("Don't be so sure of yourself.")
(We don't always want to say that an experiment or observation has
no value, or little value, for a person who is sure of distribution,
and sure that observation will not affect it; we may have objective,
UNCERTAINTY though non-specific, reasons for thinking he is wrong;
e.g., conflict with other opinions, lack of experience.

1. Problem: why are committees more trusted than individual decision-maker? What are the possible good aspects of committee decision-making? (e.g., exposure to opposing points of view reduces unwarranted assurance, may lead to uncertainty-like behavior such as experiment, observation, even though individuals retain their own subjective probability distributions. Thus, aside from effect of bringing more information to bear on problem than any one person possessed initially--thus possibly changing all of their individual prob distributions and bringing them into harmony--the committee effect may be to (a) gather information (where individuals would not have thought this necessary before; now they do, either because they are now less certain, or because this is the only way to achieve group decision); (b) on basis of given information and individual prob dists, may favor certain distributions, on basis of certain decision rules (Question: why are these rules favored by committees? When and why are they "good"?)

2. Note similarity of behavior induced by: a) subjective uncertainty (ignorance); (b) disagreement among members of a committee, and need for group decision. At least, behavior is similar if it is possible to search, experiment, gather information. Hypothesis: also similar normative decision rules on basis of given information. Latter rules may be "desirable" precisely because they tend to favor information-seeking actions when one is "ignorant" (or when actual disagreement occurs). (Note importance of choosing members of committee: in such a way that situations of disagreement are likely to correspond to "situations in which search behavior and/or group decision rule are likely to lead to better results than would the absence of search behavior or the decision rule followed by an individual chosen at random from the committee.")

Concept of committee: common payoffs, possibly differing information and subjective probabilities.

3. Similar problem to "value of committee decision" is "value of gaming" as heuristic device; value might, in some cases, be that it reduces certainty, assurance. This may reduce decisiveness, favor postponing actions or status quo actions (which may or may not be good); may also encourage information-gathering actions.

4. Various possibilities on committee: a) all members agree on subjective prob dist, vN-M payoffs (didn't need committee aspect doesn't affect decision, though it might reassure person who convened committee); b) each one is certain as to state of nature that will obtain, but all disagree (all might agree on quick, cheap observation to determine group choice); (c) they have various probability distributions over states of nature; (d) they have varying degrees of confidence in their estimates; certain types of information might affect either their estimates or their confidence, or both, perhaps in differing directions.

The "need to prove, to convince" leads to search for evidence; may lead one to reexamine beliefs, consider new evidence.

5. Distinguish between: a) situation ~~between~~ in which many reasonable individuals do disagree, or could be predicted (on basis of some theory and certain evidence) to disagree; or in which information is known to be scanty, vague, unreliable or conflicting; and (b) situation in which an individual or many individuals experience or report or give evidence of low confidence in estimates, "wide confidence intervals," ignorance, etc; (c) situations in which individuals have estimates with great variance in their probability distributions, great "risk," etc

These three may be considerably correlated; and certain types of behavior may be common, or appropriate, for all three. But for some purposes they must be distinguished.

(e.g., in case (a) it might be "appropriate," on ~~xxx~~ pragmatic ~~ex~~ basis in certain sort of situation, for individuals to act as if they were in case (b) or case (c), even if they "aren't."

6. Value of information: relative to particular actions considered, particular evaluation of states of the world ("consequences"--payoff function).

Consider action (which may be "objectively" defined) as mapping events into consequences, or given states of the world into other states of the world. A payoff function evaluates states of the world in terms of a particular problem, emphasizing certain dimensions and ignoring others (i.e., partitioning into equivalence classes, showing indifference w.r.t. "irrelevant" dimensions). In decision-making problem, certain set of actions are given, and payoff function is given.

If we think of decision as "deduction from premises"--outcomes, values, likelihoods--then a "message" or experiment, etc., might affect any of these premises. But if payoff function and set of actions are considered constant, or given, then messages or information will only affect likelihoods.

Do we want to say that a message which couldn't affect decision has no value? (or that a message that didn't affect decision had no value?) If action A dominates B, and these are only available actions, then no information on likelihoods could have value--with respect to this decision-making problem. But if action C becomes available, neither dominating nor dominated by A, then information could be valuable. And if the payoff function should change (depends on person, problem situation, occasion) A might no longer dominate B, so info could be valuable. And if a different problem were considered, in which actions D, E, F were concerned, the earlier message might be valuable.

Thus, value of information will be relative to: a) the acts considered (defined by their outcomes); (b) the payoff function evaluating outcomes. The first will depend on problem, person, situation; the second on person, occasion.

How about messages that affect payoff function? (Aside from those that do so by affecting subjective probs, etc., over states of the world; i.e., that affect evaluation of certain states of the world in terms of higher criteria, by affecting understanding of interrelationships, probabilities). What is the "meaning," the "information content" of these? How is their "value" measured?

It will also be useful to have a measure of the effect of message on likelihoods even if it may not affect decision in particular problem; it could affect other decisions, if payoff function or set of alternatives differed; thus, "value" of info to a scientist might require special measurement.

7. Distinguish between "ex post" and "ex ante" measures of value of information; and between value as foreseen or experienced by subject and as foreseen or ~~experx~~ determined by observer.

a) subject may foresee little change, or non-critical change in his expectations; but he may experience decisive change ex post. Observer may know that subject's expectations are wrong, and will be affected by experiment; or more likely, observer may know that one of subjects' beliefs are wrong (at least), and that experiment will provide basis for agreement, and for choice by observer. (On problem of using experts, see Helmer))

8. Relation of "value of information" or "information content" to "meaning." Note that a certain message may ~~be experx~~ convey no information (because redundant) without being meaningless. (Though redundancy may increase confidence, though without affecting relative likelihoods, thus without affecting measure of "quantity of information").

9. The essential feature of Knight's "risk situations" may be that they are situations in which increments of information, experiments, observations, etc., have no value w.r.t. ~~to~~ the set of actions and the payoff function considered; just as in subjective certainty. "Surprise" is considered impossible (or in practice, unlikely); additional information will not affect the assignment of probabilities; at least, to a point that might affect decision, whose consequences depend only on "gross" aspect of the prob distribution anyway (e.g., expected value).

By contrast: in Knight's "uncertainty" situations, additional information, experiments, search, etc. could greatly affect individual's "IMAGE," his subjective probabilities. "Surprise" is not considered unlikely (and is, objectively, "likely," even if individual does not perceive this--in many cases).

10. Objectively, we can compute value to team or committee of allowing or forcing a particular member to ~~receive~~ make an observation or experiment, receive a message, etc. Compare value of letting commander make decision on basis of observations transmitted to him, ~~x~~ with costs of delays--as compared to operating on plan, or letting subordinates make decisions on basis of partial information.

Spasm war exponents see alternatives, outcomes, payoffs as such as to ~~give~~ make wartime information (beyond fact of attack) "worth very little" to a commander who had made a good pre-hostilities plan. But can disagree with their view of a) alternatives, (b) payoffs over outcomes; hence, with their view of the value of information and the desirability of centralized decision-making and sequential decision-making.

11. Can imagine continuing observation, experimentation, etc. until further messages (a) can convey no additional information, or until (b) messages ~~have~~ are not "worth" their "cost," which may be high. ((Example of first: a well-balanced roulette wheel; no sequential decision rule is better than any other, or better than strategy based on no observations)).

Fact that decisions are, or must be, sometimes made under ignorance, with surprise still possible, implies that experiment has not been continued to this point (a), or that costs of observation (including costs of delaying decision) are so high that observation must be suspended although additional ones could still convey much info.

12. Simon assumes very simply structured payoffs-- "acceptable" or "not acceptable"--so that information states are simply divided into those in which information has "very high" (how high?) value, and those in which information has zero value (depending whether or not at least one available action carries "acceptable" expectation); hence, behavior has two modes, "searching" and "sticking."

13. "I PRAY you, consider that you may be mistaken." (quote?)
But: to what effect? How should that possibility affect my actions? Must I give it a definite probability? And what weight do I give the various ways I may be mistaken?

It may lead to search behavior: but: How long should I search? How much should I be willing to pay to search? How do I compare one method of search to another?

14. ~~Minimax~~ Members of committee all have (by assumption) same payoffs, so all estimates will tend to be wishful in situation of ignorance (or, situations where they disagree) (this must mean: biased in such a way as to allow "best action" under resulting likelihoods to have "acceptable" or "good" expectation). Taking, or weighting more heavily, the most pessimistic (least optimistic) of these estimates may be a way of compensating for systematic bias.

Consider forming estimate of cost in R&D project.

15. Distinguish between the way people tend to act under ignorance (e.g., wishfully) and the way they "should" act, or act when trying to be "rational" (or the way a committee acts, which may amount to same thing).

16. Value to decision-maker of forming committee of advisors; counteract tendency of individual advisor to suppress uncertainty prejudicial to what advisor thinks is "best decision." Committee may reveal uncertainties, let decision-maker respond to them; or may at least present estimates or advise "best decision" that reflect consciousness (by them) of uncertainties.

MILLERS FALLS
EVERETT
COTTON CONTENT